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***In-situ* Evaluation of Oceanographic Products for the METOC Community – Wrap-up**

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LONG-TERM GOALS

The long-term goal of this project is to improve the U.S. Navy Meteorology/Oceanography (METOC) community's ability to support the operational Navy (surface ships, submarines, anti-submarine warfare (ASW) air squadrons, SEALs, and amphibious forces) with tactically-relevant oceanographic products derived from data, models, and tactical decision aids (TDAs).

OBJECTIVES

The objective during FY01 was to complete the last of our visits to the Navy regional METOC facilities, and to provide written and oral reports on our findings to the Commander, Naval Meteorology-Oceanography Command (CNMOC), the Oceanographer of the Navy, and ONR. The broader objectives, which were accomplished primarily in FY00 are as follows:

- i) To evaluate the METOC community's use of oceanographic products in the regional METOC centers and facilities, including an assessment of which products are currently being used most frequently and which are most useful (this not necessarily being the same as the previous).
- ii) To suggest ways in which the METOC community could improve their oceanographic support, through changes which could be made to improve the utility of their ocean products, introduction of new products, and changes in training to allow METOC personnel to take better advantage of the ocean products available to them.
- iii) To identify data and technology available through the academic and government research community that could be of use to the operational community.
- iv) To facilitate cooperation and collaboration between regional METOC centers and facilities and nearby civilian, or non-Navy government, oceanographic centers.
- v) To provide feedback to the Naval Postgraduate School Oceanography Dept. on how our graduates are faring, and what changes we might make to our curricula to help our future graduates in their careers.
- vi) To provide on-site assistance and training in the use of oceanographic data and models.

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APPROACH

During FY00, together with my meteorologist husband Dr. Carlyle Wash, I visited each of the regional METOC centers and facilities for one to six weeks, with one exception. A complete itinerary and list of activities are provided in my FY00 ONR annual report, and in the technical report listed below. A small amount of support was requested for FY01 to complete these visits and to report to the sponsors and other interested parties.

WORK COMPLETED

During Nov. 2000, we completed the last of these visits with a trip to the regional METOC facility in Pensacola, FL. Following this, we gave an outbrief to the CNMOC Admiral and staff in Mississippi. In December 2000, we briefed the Oceanographer of the Navy and his staff, and ONR program managers, in Washington, DC. In January, we presented a seminar on our sabbatical findings and recommendations at NPS. In addition to providing written and verbal outbriefs to the Commanding Officers of each of the centers and facilities we visited, we also prepared and distributed in March 2001 a technical report encompassing all of our conclusions and suggestions.

RESULTS

Three major roles for METOC regional centers and facilities are identified: *i*) to be a source of local METOC knowledge and expertise for their area of responsibility, including familiarity with mesoscale circulations and all reliable sources of real-time data and model output; *ii*) to provide operational support to the fleet, including customized fused products and littoral oceanography products; and *iii*) to provide training for METOC personnel in regional-specific meteorology and oceanography, and continuing advanced technical training.

A major finding is that technical education and training is inadequate to allow METOC personnel to take maximum advantage of the full range of data, models, and tactical decision aids available to them. Weaknesses in the quality-control and verification of METOC analysis and forecast products are also identified. A number of innovative practices at individual commands are recommended for adoption throughout the claimancy.

IMPACT/APPLICATIONS

The potential future impact of this project is to improve the characterization and prediction of the battlespace environment through astute use of ocean observations and models. More immediate impacts are already being seen. As a direct result of my suggestions, the Naval Oceanographic Office is providing more information with some of their products, including things like model forcing and spatial resolution. Some of our recommendations to the regional center COs regarding training and operations have also been implemented or are under investigation.

CNMOC's recently established Professional Development Command (PDC) is funding the development of materials to train AGs (enlisted meteorology/oceanography personnel) and junior officers to make more effective use of ocean circulation and tide models.

With the advent of mesoscale meteorology analysis and forecast tools and real-time ocean analysis and prediction models, the traditional synoptic meteorological focus of the regional METOC centers is changing. It is our hope that the results of our study will help shape the future role of regional METOC centers and facilities.

TRANSITIONS

The PDC is currently funding me to develop a short course, and distance-learning materials, on the use of Navy operational ocean circulation and tide models. I identified the need for this material, and gained experience that will help me best present it, during these sabbatical visits. As mentioned under Impacts above, NAVO is increasing the amount of information provided with their ocean model products so the users can better understand how to apply the results.

RELATED PROJECTS

This project is a direct follow-on to the FY00 funding to myself (Document Number: N0001400WR20157) and Dr. Carlyle Wash (Document Number N00014100WR20027).

PUBLICATIONS

Wash, C.H. and L.K. Rosenfeld, 2001. The Role of Navy METOC Regional Centers and Facilities in the New Millennium: Thoughts from a Sabbatical Tour. Naval Postgraduate School Tech. Rept. NPS-MR-01-002, 13 pp.